

Sustainable NREL Master Plan

Fiscal Year 2005



Sustainable NREL Master Plan

Background

Sustainability, in the sense of an organization and its operations, is the simultaneous and balanced pursuit of economic viability, environmental health, and public responsibility. It is achieved over the long term through appropriate investment decisions and operating practices.

The Sustainable NREL Master Plan (“Plan”) identifies ways to help the Laboratory become more sustainable in all its operations, in synergy with the Laboratory’s mission. The Plan is based on Laboratory-wide performance objectives, supporting goals, specific implementation strategies, and an overall management plan.

Vision/Values

Sustainability is inherently a centerpiece of the work of the Laboratory. The mission of the Laboratory, to develop renewable energy and energy efficiency technologies and practices...and transfer knowledge and innovations to address the nation’s energy and environmental goals, is synergistic with sustainability.

The people of the Laboratory who support this mission hold sustainability as a core value.

NREL Sustainability Vision

NREL will exemplify sustainability in an R&D organization by maximizing efficient use of all resources; minimizing waste and pollution; and serving as a positive force in economic, environmental, and community responsibility.

Objectives

The objectives were developed as a primary outcome of a comprehensive planning process. These objectives were developed and reviewed for consistency with recognized national and international organizations engaged in sustainability activities.

As a result, the objectives have been organized for implementation in a Sustainability Management Framework context.

Economic Viability

Manage Laboratory and Sustainable NREL fiscal resources efficiently to meet all applicable regulations and effectively accomplish the Laboratory's mission, taking sustainability into consideration.

Environmental Stewardship

Campus

Manage the impact on the environment caused by the placement and general design of Laboratory structures including buildings, roads, parking, storm-water management, etc.

Sustainability Management Framework

- Economic Viability
- Environmental Stewardship
 - Campus
 - Water
 - Electricity/Natural Gas
 - Transportation
 - Reduce, Reuse, Recycle, Rebuy
 - Environmental Management
 - Education/Communications
- Public Responsibility

Maintain, protect, and restore natural and landscaped environments to sustain natural and native ecological systems, both on and adjacent to Laboratory campuses.

Water

Reduce water consumption and manage water discharges from the site, including recycling and reuse options.

Electricity/Natural Gas

Reduce energy use in all building designs and operations. As a priority, use cost-effective energy efficiency measures. Within available funds, use cost-effective renewable electricity sources for remaining electrical needs via on-site generation and/or purchase of renewable energy “green tags.”

Use nonelectrical and integrated energy technologies, such as solar hot water, solar process heat, transpired collectors, and cogeneration. Demonstrate the state-of-the-art through consciously choosing a varied portfolio of advanced, state-of-the-art technologies for building design and operation.

Transportation

Reduce the impact of local Laboratory travel (within sites, between sites, or to local destinations) on the environment through choices leading toward pedestrian campuses, the use of advanced vehicles and bicycles, walking, and public transportation. Reduce use of fossil-based gasoline/diesel fuel for the Laboratory on-site and local operations through the utilization of alternatively fueled vehicles and hybrids.

Increase the use of videoconferencing to reduce the environmental impacts of Laboratory air travel. Demonstrate the state-of-the-art through consciously choosing a varied portfolio of advanced vehicles, alternative-fuel use, and transportation options. Empower and encourage

employees to choose forms of alternative transportation while commuting between home and work – and while on business travel – that will minimize the impact on the environment.

Materials (Reduce, Reuse, Recycling, Rebuy)

Reduce the use of materials and the creation of waste by reducing, reusing, and recycling materials needed for Laboratory operations. Increase the purchase and use of environmentally sensitive products, such as products with the highest recycled content, bio-based products and products made from energy-efficient materials and processes.

Environmental Management

Provide an environment, both indoors and outdoors (adjacent to Laboratory facilities), that promotes efficiency and effectiveness, and encourages the creativity and personal motivation required for excellence in scientific, engineering, technology development, and support functions.

Education/Communication

Develop and implement a communications plan to regularly inform and provide outreach to staff about sustainability activities including a method for interaction to receive ideas and feedback. Educate staff about participating and contributing to sustainable activities.

Public Responsibility

Work creatively and proactively with local stakeholders to identify and implement collaborative projects to improve national and international sustainability. Educate others about sustainability through a variety of outreach mechanisms.

Goals

The Sustainable NREL goals are based on the Laboratory's belief that sustainability is the most effective way to manage the Laboratory and excel at its mission. These goals, including all applicable federal directives, are outlined in the Implementation Strategies section below.

The overarching goals that will be a focus of FY05 sustainability activities are characterized below. The FY05 goals related more specifically to implementation strategies are included in the Implementation Strategies section below.

Working toward Environmental Neutrality. In order to more systematically and innovatively approach sustainability at the Laboratory, an overarching Laboratory environmental goal has been established.

The Laboratory will work to be climate-neutral in its CO₂ production, evaluating both the resources brought into the Lab, as well as the wastes generated and disposed of at NREL on a life-cycle basis.

This goal identifies the environmental consequences of the choices the Laboratory makes and measures the cumulative effect of those choices in terms of a functional CO₂ common denominator. The use of such a universal metric allows the Laboratory to better understand the relative impacts of its decisions; measure progress toward sustainability neutrality; benchmark performance against goals as well as other similar institutions; and, in general, take responsibility for its actions.

Many of the overall sustainability activities included in this Plan contribute to CO₂ reduction. Energy efficiency retrofits, sustainable new building designs, use of on-site renewables, commuter programs, etc. are primary measures being pursued to reduce CO₂ production. CO₂ offsets from increased green tag purchases are also applied. The Laboratory has established an intermediate goal of reducing CO₂ by 10% in FY05.

Institutionalizing Sustainability. Significant progress has been made at the Laboratory level in achieving sustainability. The next significant opportunity is to further institutionalize sustainability at the individual level among the Laboratory staff.

A Laboratory goal is to further institutionalize sustainability by encouraging a more active participation of each individual in supporting the Laboratory's sustainability activities and specifically in terms of personal accountability.

Near-Zero Waste. The objective under a Near-Zero Waste goal is to work to eliminate the Laboratory's waste stream. It is also the next step in holistically coordinating and managing our reduce/recycling/reuse and environmentally preferable purchasing (rebuy) activities to enhance overall effectiveness. This goal enables the Laboratory to manage operating costs.

Implementation Strategies

In addition to the commitment to meet all federal directive-based goals, the Laboratory has established strategies to exceed these goals, as well as developed additional goals in support of this Plan. The Implementation Strategies for this suite of goals is provided below.

Management Framework Category	Goal (Responsible Party)	Implementation Strategy
Economic Viability	<u>Laboratory Directive:</u> Consider sustainability in managing Laboratory resources, while meeting all applicable regulations and effectively accomplishing the Laboratory mission. (Executive Management, Bob Westby)	<p>Consideration of sustainability will be included in the management of Laboratory funds for planning, new construction, operation and maintenance, information technology, General Purpose Projects (GPP) and General Purpose Equipment (GPE) projects, Sustainable NREL, etc.</p> <p>Perform an assessment of the Sustainable NREL program using the performance indicators included in the 2002 Global Reporting Initiative Sustainability Reporting Guidelines. This assessment will serve as program review and provide recommendations for enhancements.</p>

Management Framework Category	Goal (Responsible Party)	Implementation Strategy
Environmental Stewardship		
CAMPUS		
Site Planning	<u>Laboratory Directive:</u> Implement the 2003 Laboratory General Development Vision (GDV). (Nancy Carlisle)	Develop and initiate implementation of a five-year strategy for implementing the GDV, specifically focusing on roads and infrastructure-related issues that will be most relevant to development occurring on the South Table Mountain site in the next five years.
WATER		
	<u>E.O. 13123, Greening the Government Through Efficient Energy Management:</u> All requirements of the E.O. met or exceeded. Assess and implement any additional cost effective Best Management Practices (BMPs). (Stephanie Tanner)	<ul style="list-style-type: none"> • Update the Laboratory Water Efficiency Plan. • Reduce laboratory water use below the FY04 level. • Identify and implement any cost-effective water-conservation measures beyond the comprehensive suite of BMPs already implemented.

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ELECTRICITY/ NATURAL GAS USE		
	DOE Order 430.2A, <u>Departmental Energy and Utilities Management (primary requirements):</u> (Otto VanGeet - overall Energy Management lead)	Continue implementation of DOE Order 430.2A.
	Reduce energy consumption per gross square foot based on Industrial and Laboratory baseline energy use of 352,540 Btu/SF.	<ul style="list-style-type: none"> • Continue to further exceed all federally mandated energy use-reduction goals. • Reduce energy use per gross square foot below FY04 levels.
	Purchase electricity from nonhydroelectric renewable energy sources (Bob Westby)	<ul style="list-style-type: none"> • Continue to purchase Renewable Energy Certificates (REC) equal to 10% (at a minimum) of the Laboratory's annual electrical use. • Enter into a RECs purchase agreement with a supplier whose projects support rural Colorado small wind projects. This agreement will result in the Laboratory securing more greenhouse gas (GHG) emission reductions at the same cost. • Develop and initiate implementation of an employee green power purchasing match program.

Management Framework Category	Goal (Responsible Party)	Implementation Strategy
	Planning/ Reporting (Anna Hoenmans)	<ul style="list-style-type: none"> • Update Laboratory Energy Management Plan. • Prepare/submit Annual DOE Energy and Water Use Report. • Recommend and support Laboratory energy projects.
	Increase the use of on-site renewable energy electric and thermal systems (Otto VanGeet)	<ul style="list-style-type: none"> • Utilize renewable energy systems where cost effective on new buildings and retrofits.
	Reduce Green House Gas (GHG) emissions attributed to facility energy use (Dan Bilello)	<ul style="list-style-type: none"> • Meet or exceed the Laboratory's FY05 GHG emission reduction target of 10%. • Provide annual report to EPA Climate Leaders Partnership on meeting the GHG emission reduction target. • Support the implementation of new EPA Climate Leaders Partnership reporting protocols. • Support energy-use reduction and other activities that reduce GHG emissions.
	Demonstrate leadership by designating newly designed facilities as FEMP Showcase facilities (Anna Hoenmans)	<ul style="list-style-type: none"> • Nominate the NWTC Site Entrance Building (Near-Zero Energy Building) as a FEMP Showcase facility.

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New Buildings	<p><u>DOE Order 430.2A/ Ongoing Laboratory Directive:</u> Apply sustainable design principles to new buildings. New Laboratory buildings will significantly exceed 10CFR434/ASHRAE 90.1 requirements</p> <p>(Otto VanGeet, Nancy Carlisle, Anna Hoenmans)</p>	<ul style="list-style-type: none"> • All new buildings will be designed to reduce energy use by 30% or more compared to an ASHRAE 90.1 base case. Achieve at least a Leadership in Energy and Environmental Design (LEED) silver-level rating. • Work to maintain the as-designed Science and Technology Facility (S&TF) LEED gold-level rating. • Work to maintain the proposed Research Support Facility (RSF) LEED platinum-level rating. • The Laboratory space of all new buildings will apply the principles of the EPA/DOE Laboratories for the Twenty-First Century (LF21C) program.
Peak Load Management	<p><u>Laboratory Directive.</u> Enhance/formalize the Laboratory's Peak Load Management Plan/activities</p> <p>(Otto Van Geet, Anna Hoenmans, Sal Sferreza)</p>	<p>Formalize and initiate implementation of a Laboratory Peak Load Management Plan</p> <ul style="list-style-type: none"> • Use the Laboratory's load analysis software and site/process metering capabilities to manage peak load. • Implement demand management activities at the NWTC. • Provide peak load data reports to Laboratory management, building managers, and occupants.

Management Framework Category	Goal (Responsible Party)	Implementation Strategy
		<ul style="list-style-type: none"> Coordinate data with existing energy management control system operation to further reduce peak load demand and utility costs.
Institutionalizing Building Occupant /Manager Energy-Use Reduction	<u>Laboratory Directive.</u> Reduce energy use by informing building occupants/managers of their specific usage and educate them about energy-use reduction opportunities (Otto Van Geet, Anna Hoenmans, Susan Huffnagle, Don Reed)	<ul style="list-style-type: none"> Continue providing Web-based historic and current building-by-building electric, natural gas, and water use to Laboratory staff. Implement voluntary computer power-management program. Educate occupants/building area engineers on energy-use reduction opportunities and provide incentives for improvements and feedback on progress.
TRANSPORTATION		
	<u>1) Environmental Policy Act (EPACT) '92:</u> 75% of light-duty vehicle (LDV) acquisitions shall be AFVs; <u>2) Laboratory Directive:</u> 100% of LDV fleet shall be AFVs or hybrids (Tim Peele)	1) Exceed the EPACT requirement by making 100% of Laboratory LDVs acquisition AFVs or hybrids. 2) 80% of nonexempt fleet is AFV or hybrid.

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	<u>E.O. 13149, Greening the Government Through Federal Fleet and Transportation Efficiency and DOE Compliance Strategy for E.O. 13149 et al:</u> (Tim Peele)	
	Reduce fleet petroleum use by 20% by 2005 (compared to 1999)	Exceed the E.O. 13149 requirement by achieving the use-reduction goal substantially prior to 2005.
	Raise fleet average rated fuel economy for non-AFV LDVs acquisitions by 1 mpg by 2003 and 3 mpg by 2005	Meet or exceed this requirement (if applicable as the Laboratory has not made any non-AFV LDV acquisitions since FY00).
	Reduce fleet petroleum use by 82% by 2005 as compared to 1999.	Meet or exceed this requirement, which has been set at 82% for the Laboratory by the DOE Compliance Strategy for the E.O. 13149 vs. 20% for the overall DOE.
MATERIALS (REDUCE, REUSE, RECYCLE, REBUY)		
	<u>E.O. 13101, Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition; Resource Conservation and Recovery Act (RCRA) of 1976; EPA Comprehensive Guidelines (CPG):</u>	Develop and begin implementation of a Laboratory Near-Zero Waste program.

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	Prevent waste whenever feasible and recycle waste that is not preventable. (Recycling Advisory Committee)	<ul style="list-style-type: none"> • Reduce the use of materials and creation of waste by reducing the amount of materials brought into the Laboratory and increase the practical reuse of materials brought into the Laboratory. • Continue and expand the Laboratory's comprehensive recycling program. • Recycle more materials in FY05 than in FY04, working to reduce the recyclables content of the overall Laboratory waste stream.
	Implement cost-effective procurement preference programs for environmentally preferable products and services (Don Carlile, Susan Huffnagle)	<ul style="list-style-type: none"> • Purchase and use environmentally sensitive products in balance with performance and cost goals, including products with the highest recycled content, bio-based products, products made from energy-efficient materials and processes, and products made locally. • Implement the purchase card "green" procurement program. • Implement an on-line, green-only office supplies procurement system. • Perform as Laboratory lead in the DOE Buy-Bio Program. Implement pilot program in use of bio-diesel fuel

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		<p>and continue pilot use of ethanol in the vehicle fleet.</p> <ul style="list-style-type: none"> Implement reusable office-supply centers at the STM, NWTC, and Denver West leased buildings.
	<u>E.O. 13221, Energy-Efficient Standby Power Devices:</u> Purchase products with internal and external standby power devices that use no more than 1 watt (Henri Hubenka)	<p>Purchase only products with internal and external standby power devices that use no more than 1 watt, including products covered by Energy Star guidelines.</p>
ENVIRONMENTAL MANAGEMENT		
Environmental Management System (EMS)	<u>E.O.13148 (DOE Order 450.1), Greening the Government Through Leadership in Environmental Management:</u> (Maureen Jordan)	<ul style="list-style-type: none"> Implement the eight criteria of the Contractor Requirements Document (CRD) section of DOE Notice 450.4, <i>Assignment of Responsibilities for Executive Order 13148</i>. Implement the Laboratory Environmental Management System (EMS) Policy 6.2, including ongoing environmental objectives and areas for improvement identified in the 2004 EMS Self-Assessment.
Sustainability Management System (SMS)	<u>Laboratory Directive:</u> Initiate implementation of SMS as an enhancement of the Laboratory's	<ul style="list-style-type: none"> Report as required by the EPA National Environmental Performance Track and Colorado Department of

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	Environmental Management System (EMS) (Denise Rayborn, Maureen Jordan)	Health and Environment (CDHPE) Environmental Leadership programs. <ul style="list-style-type: none"> Continue to develop and promote the SMS concept.
EDUCATION/COMMUNICATION		
Communications	<u>Laboratory Directive:</u> Implement the FY05 Plan for communications to Laboratory staff. (Michelle Kubik, Susan Huffnagle)	<ul style="list-style-type: none"> Continue use of and update the Sustainable NREL Web site, including the Performance Data links. Continue to implement a staff education activity that includes sustainability assessment tools for individual staff members. Continue to issue monthly Laboratory newsletter, the Sustainable Pioneer. Publish a 2004-2005 NREL Sustainability Report.
Policies and Procedures	<u>Laboratory Directive:</u> Establish Sustainability Policy and Procedures (Laura Michael)	Update, as required, the Laboratory's formal sustainability policy, 2-7 Sustainable NREL, as well as the multiple linkages to the other relevant policies and procedures.
Public Responsibility		
Outreach/Demonstrate Leadership	<u>Laboratory Directive:</u> Use outreach activities to educate and work with various stakeholders, demonstrating NREL's leadership in this area. (Lee Boughey, Bob Westby)	<ul style="list-style-type: none"> Support and participate in Laboratory stakeholder organizations working in sustainability. Conduct public activities and promote transferable sustainability tools.

Management Framework Category	Goal (Responsible Party)	Implementation Strategy
		<ul style="list-style-type: none"> • Seek recognition through demonstration of leadership in national sustainability and awards programs.

Management Plan

Executive Management has appointed a Sustainable NREL Lead, Bob Westby, who is responsible for implementing the Plan. A Sustainable NREL Coordinator, Susan Huffnagle, assists in Plan implementation. A collaborative working group from throughout the Laboratory provides primary support in the Plan implementation (refer to Responsible Party designees in the Goal column of the Implementation Strategies Plan).

A Sustainability Policy that institutionalizes sustainability activities is a formal part of the Laboratory's policies and procedures. The Laboratory's Performance-Self Assessment includes a specific performance metric for requiring implementation of the Plan. The Laboratory planning processes and documents include and reflect an operational sustainability vision and overall goals, and respond to results of internal and external sustainability assessments.